PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl No. : 10/772,616 Confirmation No.5077
Applicant : Bissonnette et al.
Filed : February 5, 2006
Title : By-Pass Valve Mechanism And Method of Use Hereof

TC/A.U. : 3672
Examiner : Coy, Nicole A.

Docket No. : 25.0246
Customer No. : 25576

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450 April 20, 2006

Commissioner:

In response to the Office action of January 20, 2006, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 15 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A by-pass valve mechanism for a well treatment tool comprising a first ~~having at least one~~ packer element for sealing against a ~~within the~~ well casing ~~of a well~~, permitting by-pass of well fluid past the first packer element ~~of the well treatment tool~~ during conveyance of the well treatment tool within the well casing, comprising:

a by-pass valve housing ~~being~~ connected with ~~a~~ the well treatment tool and defining an internal flow passage ~~in communication with a tubing string~~ and at least one by-pass port establishing communication of the internal flow passage with an annulus between said by-pass valve housing and the well casing;

a valve element ~~being~~ moveable relative to ~~within~~ said by-pass valve housing between an open position permitting flow of well fluid through said at least one by-pass port and a closed position blocking the flow of well fluid through said at least one by-pass port;

at least one retainer securing said valve element at said open position ~~permitting fluid by-pass during tool running~~ and releasing said valve element for closing movement responsive to a predetermined ~~fluid~~ pressure;

wherein the tool is a fracturing tool comprising straddle packer elements straddling a channel, and wherein the straddle packer elements are disposed between said first packer element

and said at least one by-pass port, such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port.

2. (Currently Amended) The by-pass valve mechanism of claim 1, wherein said predetermined ~~fluid~~ pressure is tubing pressure.

3. (Currently Amended) The by-pass valve mechanism of claim 1, wherein said predetermined ~~fluid~~ pressure is ~~the~~ hydrostatic pressure ~~of~~ from fluid within the well casing.

4. (Original) The by-pass valve mechanism of claim 1, comprising:

said by-pass valve housing defining an annular valve seat; and

said valve element being a tubular sleeve valve element located at least partially within said annular valve receptacle and defining a valve member, said tubular sleeve valve element being linearly moveable from an open position with said valve member retracted from said annular valve seat and permitting fluid flow through said at least one by-pass port and a closed position with said tubular valve portion establishing sealed engagement with said annular valve seat and blocking fluid flow through said at least one by-pass port.

5. (Original) The by-pass valve mechanism of claim 4, comprising:

said by-pass valve housing defining an internal housing sealing surface having a defined internal diameter;

said annular valve seat having an internal seat surface having a diameter less than said defined internal diameter; and

said tubular valve portion having a middle seal of a diameter establishing sealing engagement only with said internal housing sealing surface and having a lower seal of a diameter establishing sealing engagement only with said internal seat surface.

6. (Original) The by-pass valve mechanism of claim 5, comprising:

said internal housing sealing surface and said internal seat surface each being of cylindrical configuration and being of differing diameters.

7. (Original) The by-pass valve mechanism of claim 1, comprising:

said by-pass valve housing defining a valve receptacle and an annular valve seat; and

said valve element being a tubular sleeve valve element located at least partially within said annular valve receptacle and defining a circular valve member, said tubular sleeve valve element being linearly moveable within said valve receptacle from an open position with said valve member retracted from said annular valve seat and permitting fluid flow through said at least one by-pass port and a closed position with said tubular valve portion located within said valve receptacle and establishing sealed engagement with said annular valve seat and blocking fluid flow through said at least one by-pass port.

8. (Original) The by-pass valve mechanism of claim 1, comprising:

said by-pass valve housing defining a piston sealing surface;

said valve element being a sleeve valve element having an annular piston seal disposed in sealing engagement with said piston sealing surface and defining a pressure responsive area; and

fluid pressure within said flow passage acting on said pressure responsive area and developing a resultant force urging said sleeve valve element toward said closed position thereof.

9. (Original) The by-pass valve mechanism of claim 1, comprising:

said valve element being a tubular sleeve valve element defining at least one hydraulic area; and

fluid pressure within said flow passage acting on said at least one hydraulic area and maintaining said tubular sleeve valve element at said closed position one valve closure has occurred.

10. (Original) The by-pass valve mechanism of claim 1, comprising:

said at least one retainer being at least one shear element retaining said valve element at said open position thereof and shearing responsive to predetermined force on said valve element and releasing said valve element for pressure responsive closing movement.

11. (Original) The by-pass valve mechanism of claim 1, comprising:

said by-pass valve housing having upper and lower housing subs being releasably connected and defining an annular chamber having a generally cylindrical piston sealing surface;

said valve element being a sleeve valve member having an annular piston seal disposed in sealing engagement with said piston sealing surface; and

an upper seal element and a middle seal element establishing sealing between said sleeve valve element and said upper and lower housing subs on opposing sides of said annular piston seal and being of substantially equal sealing diameter.

12. (Original) The by-pass valve mechanism of claim 11, comprising:

said annular piston seal engaging said generally cylindrical piston sealing surface defining a hydraulic area of said sleeve valve element; and

at least one pressure port being defined in said by-pass valve housing and communicating annulus pressure externally of said by-pass valve housing to said hydraulic area of said sleeve valve element and developing a pressure responsive force urging said sleeve valve element toward said closed position thereof.

13. (Original) The by-pass valve mechanism of claim 1, comprising:

said by-pass valve housing defining an internal sleeve valve recess;

said valve element being a tubular sleeve valve member moveable within said internal sleeve valve recess between said open and closed positions; and

a tubular erosion sleeve element being located within said by-pass valve housing and having a portion thereof extending within said sleeve valve member and defining a protective internal covering minimizing the development of turbulence within said by-pass valve housing by-pass valve housing and minimizing fluid flow erosion of said sleeve valve element and said sleeve valve recess.

14. (Original) The by-pass valve mechanism of claim 1, comprising:

said valve element being a tubular sleeve valve member moveable within said by-pass valve housing during closing movement thereof, said tubular sleeve valve member defining a locking recess; and

a lock member located within said by-pass valve housing and being moveable into said locking recess upon closure of said tubular sleeve valve member and securing said tubular sleeve valve member at said closed position.

15. (Currently Amended) A method for by-passing well fluid past a first packer element of a well treatment tool having a treatment fluid passage during conveyance of the well treatment tool within a ~~the~~ well casing, comprising:

connecting a by-pass valve mechanism to the well treatment tool, said by-pass valve mechanism having a by-pass valve housing ~~body~~ defining a flow passage being in communication with

said treatment fluid passage and comprising ~~having~~ at least one by-pass port for communicating said ~~flow~~ fluid passage with an annulus between the by-pass valve housing ~~well treatment tool~~ and the well casing, said by-pass valve mechanism comprising ~~having~~ a valve element being moveable relative to ~~within~~ said by-pass valve housing between an open position permitting by-pass flow of well fluid through said at least one by-pass port and a closed position blocking by-pass flow of well fluid through said at least one by-pass port;

connecting said by-pass valve housing ~~body~~ with a string of conveyance and treatment fluid supply tubing;

retaining said valve element at said open position during running of said well treatment tool and by-pass valve mechanism and permitting by-pass of fluid between said treatment fluid passage and said annulus;

releasing said valve element from said open position to said closed position responsive to a predetermined ~~fluid~~ pressure; and

~~causing pressure responsive movement of said by-pass valve element from said open position to said closed position.~~

wherein the tool is a fracturing tool comprising straddle packer elements straddling a channel, and wherein the straddle packer elements are disposed between said first packer element and said at least one by-pass port, such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port.

16. (Original) The method of claim 15, comprising:

upon closing of said valve element, retaining said valve element at said closed position.

17. (Original) The method of claim 15, comprising:

employing tubing pressure for said pressure responsive movement of said valve element to said closed position.

18. (Original) The method of claim 15, comprising:

employing hydrostatic pressure of fluid for said pressure responsive movement of said valve element to said closed position.

19. (Original) The method of claim 15, wherein at least one shear element retains said valve element at said open position and said valve element is sealed to said by-pass valve body and defines a piston area, said method comprising:

said releasing step being applying sufficient pressure responsive force to said piston area to shear said at least one shear element and release said valve element from said by-pass valve body; and

applying sufficient pressure responsive force to said piston area to move said valve element from said open position to said closed position.

20. (Original) The method of claim 19, wherein said valve element defines a lock recess and a lock member is retained within said by-pass valve body and enters said lock recess when said valve element reaches said closed position, said method comprising:

causing pressure responsive movement of said valve element toward said closed position and positioning said lock recess in registry with said lock member; and

moving a portion of said lock member into said lock recess and causing said lock member to retain said valve element at said closed position.

21. (Currently Amended) A by-pass valve mechanism for a well treatment tool comprising a first ~~having at least one~~ packer element for sealing against a ~~within the~~ well casing ~~of a well~~, permitting by-pass of well fluid past the first packer element ~~of the well treatment tool~~ during conveyance of the well treatment tool within the well casing, comprising:

a by-pass valve housing ~~being~~ connected with ~~a~~ the well treatment tool and defining an internal flow passage ~~in communication with a tubing string~~ and ~~having~~ at least one by-pass port establishing communication of the internal flow passage with an annulus between said by-pass valve housing and the well casing, said by-pass valve housing defining an annular internal valve receptacle and an annular internal valve seat;

a tubular valve element ~~being~~ moveable relative to ~~within~~ said annular internal valve receptacle between an open position permitting flow of well fluid through said at least one by-pass port and a closed position establishing sealing with said annular internal valve seat and blocking the flow of well fluid through said at least one by-pass port and permitting the flow of fluid through said internal flow passage;

at least one shear element ~~being~~ mounted to said by-pass valve housing and having retaining engagement with said tubular

valve element and securing said valve element at said open position ~~permitting fluid by-pass during tool running~~ and being sheared and releasing said valve element for closing movement responsive to a predetermined ~~fluid~~ pressure; and

wherein the tool is a fracturing tool comprising straddle packer elements straddling a channel, and wherein the straddle packer elements are disposed between said first packer element and said at least one by-pass port, such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port.

22. (Currently Amended) The by-pass valve mechanism of claim 21, wherein said predetermined ~~fluid~~ pressure is tubing pressure.

23. (Currently Amended) The by-pass valve mechanism of claim 21, wherein said predetermined ~~fluid~~ pressure is the hydrostatic pressure of fluid within the well casing.

24. (Original) The by-pass valve mechanism of claim 21, comprising:

said by-pass valve housing defining an internal housing sealing surface having a defined internal diameter;

said annular valve seat having an internal seat surface having a diameter less than said defined internal diameter; and

said tubular valve portion having a middle seal of a diameter establishing sealing engagement only with said internal housing sealing surface and having a lower seal of a diameter

establishing sealing engagement only with said internal seat surface.

25. (Original) The by-pass valve mechanism of claim 21, comprising:

said internal housing sealing surface and said internal seat surface each being of cylindrical configuration and being of differing diameters; and

said lower seal being spaced from said internal housing sealing surface and establishing sealing engagement with said internal seat surface preventing damage to said lower seal during movement of said sliding sleeve valve element to said closed position.

26. (Original) The by-pass valve mechanism of claim 21, comprising:

said annular valve seat defining an internal seat receptacle; and

said tubular valve element defining a tubular valve member establishing sealed engagement within said internal seat receptacle at said closed position of said tubular valve element and blocking fluid flow through said at least one by-pass port and permitting fluid flow through said tubular valve member.

27. (Original) The by-pass valve mechanism of claim 21, comprising:

said by-pass valve housing defining an internal piston sealing surface;

said tubular sleeve valve element having an annular piston seal disposed in sealing engagement with said piston sealing surface and defining a pressure responsive area; and

fluid pressure within said flow passage acting on said pressure responsive area and developing a resultant force urging said tubular sleeve valve element toward said closed position thereof; and

fluid pressure within said flow passage acting on said pressure responsive area and maintaining said tubular sleeve valve element at said closed position once valve closure has occurred.

28. (Original) The by-pass valve mechanism of claim 21, comprising:

said by-pass valve housing having upper and lower housing subs being releasably connected and defining an annular chamber having a generally cylindrical piston sealing surface;

said tubular sleeve valve element having an annular piston seal disposed in sealing engagement with said piston sealing surface; and

an upper seal element and a middle seal element establishing sealing between said tubular sleeve valve element and said upper and lower housing subs on opposing sides of said annular piston seal and being of substantially equal sealing diameter.

29. (Original) The by-pass valve mechanism of claim 28, comprising:

said annular piston seal engaging said generally cylindrical piston sealing surface defining said pressure responsive area of said tubular sleeve valve element; and

at least one pressure port being defined in said by-pass valve housing and communicating annulus pressure externally of said by-pass valve housing to said pressure responsive area of said sleeve valve element and said annulus pressure and tubing pressure developing a pressure responsive force urging said tubular sleeve valve element toward said closed position thereof.

30. (Original) The by-pass valve mechanism of claim 21, comprising:

said by-pass valve housing and said tubular sleeve valve element defining a sealed variable volume atmospheric chamber therebetween; and

air present within said sealed atmospheric chamber being compressed by decreasing volume of said variable volume atmospheric chamber during closing movement of said tubular sleeve valve element and cushioning closing movement thereof.

31. (Original) The by-pass valve mechanism of claim 21, comprising:

a test pressure control mechanism being present within said by-pass valve housing and permitting application of predetermined maximum test pressure to the well without causing shearing of said at least one shear element.

REMARKS/ARGUMENTS

Claims 1-31 are pending in this application, of which claims 1, 15 and 21 are independent. Claims 1-3, 15, and 21-23 have been amended. The amendments add no new matter and find full support in the application as originally filed. In view of the above amendments and following remarks, Applicant respectfully requests reconsideration and a timely indication of allowance.

Drawings

The Examiner has objected to the drawings under 37 CFR 1.83(a) stating that the annular seat valve must be shown in the drawings or canceled from the claims. The Applicant respectfully submits that the annular seat valve is shown, for example, by reference numeral 26 in FIG. 1. Accordingly, Applicant respectfully requests that the objection to the drawings be withdrawn.

Rejections Under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a)

The Examiner has rejected claims 1, 4-16, 19-21 and 24-31 under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baker (U.S. Patent No. 2,878,877). The Examiner has also rejected claims 2, 3, 17, 18, 22 and 23 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baker. Applicant respectfully traverses these rejections.

Claim 1 is directed to a by-pass valve mechanism for a well treatment tool comprising a first packer element for sealing

against a well casing, and at least one by-pass port in the by-pass valve mechanism, wherein the tool is a fracturing tool comprising straddle packer elements which are "disposed between said first packer element and said at least one by-pass port, such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port."

Baker does not disclose, teach or suggest the a fracturing tool as recited in claim 1. Nor does Baker disclose, teach or suggest a fracturing tool comprising straddle packer elements which are disposed between a first packer element and at least one by-pass port in a by-pass valve mechanism, "such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port" as specified in claim 1. Consequently, for either of these reasons, Applicant respectfully submits that claim 1 is in condition for allowance over Baker.

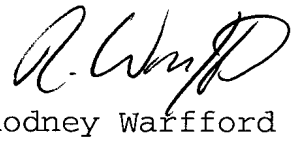
Independent claims 15 and 21 each similarly recite a fracturing tool comprising straddle packer elements which are "disposed between said first packer element and said at least one by-pass port, such that pressure is diverted from the straddle packer elements when well fluid flows past the first packer element and into the at least one by-pass port." Baker does not disclose, teach or suggest these elements of claims 15 and 21. As such, Applicant respectfully submits that each of claims 15 and 21 are in condition for allowance over Baker.

Claims 2-14, 16-20, and 22-31 depend, respectively, from claims 1, 15 and 21. Claims 1, 15 and 21 are now each believed

to be in condition for allowance over Baker. As such, Applicant submits that claims 2-14, 16-20, and 22-31 are each also allowable over Baker as being dependent from an allowable base claim and for the additional limitations they contain therein. Accordingly, Applicant respectfully requests that the rejection of claims 1, 4-16, 19-21 and 24-31 over Baker under 35 U.S.C. § 102(b); and the rejection of claims 1-31 over Baker under 35 U.S.C. § 103(a) be withdrawn.

In view of the above amendments and remarks, Applicant respectfully submits that claims 1-31 are in condition for allowance, and a timely indication of allowance is respectfully requested. If there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated.

Respectfully submitted,



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